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MEMORANDUM

TO:	Michael Berkoff, USEPA	REF. NO.:	056393-07
FROM:	Jodie Dembowske/Greg Carli/23	DATE:	August 26, 2013
CC:	Richard Gay, Weyerhaeuser Kristi Zakrzewski, MDEQ Jeff Keiser, CH2MHill Scott Hutsell, CH2MHill		
RE:	Soil Gas and Landfill Gas Investigation - July 2013 12th Street Landfill Operable Unit No. 4 Allied Paper/Portage Creek/Kalamazoo River Superfund Site, Otsego Township, Michigan		

This memorandum has been prepared by Conestoga-Rovers & Associates, Inc. (CRA) to summarize the results of the soil gas and landfill gas investigation performed at the 12th Street Landfill (Site), Operable Unit No. 4 – Allied Paper/Portage Creek/Kalamazoo River Superfund Site, located in Otsego Township, Michigan between July 8 and July 12, 2013.

The purpose of the investigation was to determine the extent of landfill gas south of two of the gas probes associated with the 12th Street Landfill as outlined in the work plan submitted by CRA to the United States Environmental Protection Agency (USEPA) Region 5 on May 8, 2012, and approved by USEPA on May 23, 2013. In preparation for the work, CRA reviewed the additional landfill gas data (included in the Annual Report submitted to the USEPA on April 12, 2013) collected between the time the original work plan was submitted and the USEPA's approval. MDEQ's comments on the work plan submitted to the USEPA on May 16, 2012, were also considered during this review. As a result, CRA determined that modifications to supplement the scope of the approved work plan would provide more useful information in evaluating the extent of landfill gas present adjacent to the 12th Street Landfill in the proximal areas of GP-1 and GP-2.

1.0 INTRODUCTION/BACKGROUND

CRA, on behalf of the Weyerhaeuser NR Company (Weyerhaeuser), has been conducting operation, maintenance, and monitoring activities at the 12th Street Landfill in accordance with the Operation, Maintenance, and Monitoring Plan (OM&M Plan) for the Site, which was approved by the USEPA on May 23, 2013.As part of the monitoring activities for the Site, CRA has obtained landfill gas readings from the three landfill gas probes installed along the southern and western perimeter of the Site on a quarterly basis from October 2011 through July 2013. The gas probes have been monitored for percent methane (CH_4), percent carbon dioxide (CO_2), percent oxygen (O_2), and pressure. The results of the quarterly landfill gas probe monitoring are presented in Table 1. As shown in Table 1, levels of CH_4 have been observed in gas probes GP-1 and GP-2 during the monitoring activities. These two gas probes are located along the southern boundary of the landfill, as shown on Figure 1. There are no local receptors in the vicinity of GP-1; however, there is a possible receptor to the south-southwest of GP-2 (approximately 100 feet).

In response to the levels of CH_4 present in the two southern gas probes, CRA conducted an additional landfill gas monitoring event on April 30, 2012 to confirm the data observed in the previous monitoring events and to obtain additional landfill data. During the April 30, 2012 event, landfill gas readings from each of the 11 gas vents were collected in addition to readings taken from the gas probes. The results of the landfill gas vent data are presented in Table 2. While on Site during the April 30, 2012 event, CRA also collected ambient air gas readings as close to the ground as possible in the vicinity of GP-1 and GP-2. These readings indicated ambient air conditions (i.e., 0 percent CH_4 and approximately 21 percent O_2).

The generation of landfill gas is inconsistent with the predesign studies completed at the Site regarding landfill gas quality and quantity, which indicated that minimal landfill gas was being generated by the landfill. The change in conditions is likely due to the 2010 re-grading of the paper residuals resulting from the cut back to the slopes of the landfill and the placement of paper residuals from outside the footprint of the landfill. Although it is likely that the landfill gas being generated at the Site is temporary due to the disturbance of paper residuals during the Remedial Action, Weyerhaeuser proposed conducting an investigation to further investigate the nature and extent of landfill gas present along the southern boundary of the Site.

2.0 SCOPE OF WORK

The soil gas and landfill gas investigation was based on the work plan approved by the USEPA on May 16, 2013. Modifications made to the approved work plan included adding the vertical interval monitoring component to the soil gas investigation; the installation of two gas probes; and the completion of a soil boring south of 12th Street to confirm geologic conditions to the south of the landfill. The soil gas investigation was conducted in accordance with the Michigan Department of Environmental Quality (MDEQ) Draft Operational Memorandum No. 4 (Site Characterization and Remediation Verification) Attachment 5 – Methane (June 2006). Indoor air monitoring, discussed in the approved work plan was conducted as described in the work plan at the three buildings located south of GP-2.

Soil Gas Investigation

The soil gas investigation included the collection of vertical soil gas readings adjacent and south of GP-1 and GP-2. Soil gas readings were collected at a grid spacing of 10 to 20 feet to the east, west, and south of both GP-1 and GP-2. Monitoring was conducted at vertical intervals to a predetermined depth that was based on the stratigraphy and depth to groundwater. Readings for percent CH_4, percent CO_2, percent O_2, and pressure were collected to determine the relative incremental elevation (i.e., zone) that CH_4 may be travelling and the highest concentration of CH_4. A Landtec Gas Extraction Monitor (GEM) 500 was used to collect the readings (CH_4, CO_2, O_2). The Landtec GEM is industry standard equipment that uses an infrared sensor for detection of methane on a percent by volume or percent lower explosive limit (LEL) basis. Additional soil gas monitoring locations extending away from the target locations (GP-1 and GP-2) were conducted until CH_4 readings reached zero. Pressure readings were collected using a Dwyer digital manometer. Monitoring locations were surveyed.

Soil Boring

A soil boring (continuous to 25 feet below grade) was completed on the south side of 12th Street in the vicinity of GP-2 to determine if a gravely/more permeable lithology present at approximately 18 to 20 feet

below grade at the south boundary of the landfill is continuous to the south. SB-1-2013 was positioned approximately 40 feet south of GP-2. The soil boring log is attached to this memorandum in Attachment A.

Gas Probe Installation

Ground water has been repeatedly present in GP-3, located on the west side of the landfill near the wetland, during landfill gas monitoring events. As part of this investigation, gas probe GP-3A was installed at a shallower interval (screened from 1.2 to 2.0 feet below grade) adjacent to GP-3. The gas probe construction log is attached to this memorandum in Attachment A. GP-3 was not abandoned and attempts to collect landfill gas readings from this probe will be made during the next monitoring event.

An additional gas probe, referred to as GP-4, was also installed near GP-2. GP-4 has a screened interval of 15 to 20 feet below grade and is screened to provide a more specific interval for monitoring landfill gas in this area targeted at the gravely zone noted during this investigation. GP-2 is screened from 5 to 30 feet below grade. The GP-4 construction log is included in Attachment A.

Indoor Air Monitoring

Indoor air monitoring was conducted from the interior of the three Aggregate Industries, Inc. buildings located south of the landfill at 475 12th Street, Plainwell, Michigan. Indoor air monitoring was conducted at the concrete slab surface within the buildings. Monitoring was targeted at cracks, concrete seams and drains within the buildings. Readings for percent CH_4, percent CO_2, percent O_2, and pressure were collected using a Landtec GEM 500.

2.1 TEMPORARY SOIL GAS MONITORING POINT INSTALLATION METHODOLOGY AND SOIL GAS MEASUREMENT COLLECTION METHODS

The temporary soil gas monitoring points were installed through the native soils using a direct push device. The direct push borings were approximately 2 inches in diameter and extended to the predetermined depth. Upon reaching the target depth, the probe rods were pulled back and the expendable drive point was dislodged. A stainless steel 10 slot screen was deployed 2 feet through the end of the Geoprobe rods. A cap was threaded onto the top of the Geoprobe rod that contained a hose barb to attach tubing to connect the sampling equipment. Once the temporary Geoprobe rod was in place, soil gas was purged from the rods for 3 minutes prior to taking the soil gas readings. This method of installation allowed for observations of soil gas to be made at deeper intervals than could be achieved by driving the points by hand, and ensured that all the intended samples were collected.

2.2 FIELD IMPLEMENTATION

GP-1 Area

A total of 20 monitoring locations were completed adjacent and south of GP-1. Monitoring locations are shown on Figure 2. The proposed 10 foot grid layout was adjusted slightly in the field due to trees present on the MNDR property in the work area. Soil gas readings were not collected from Columns A1 or H.

Vertical soil gas monitoring at depths of 2-4 feet, 4-6 feet and 6-8 feet below grade was completed at each location. Groundwater in the area of GP-1 is estimated at 7-8 feet below grade, therefore, the soil gas sampling locations were not conducted at deeper intervals. Soil gas readings from the GP-1 area investigation are presented in Table 3.

Monitoring locations were extended south of GP-1 until a methane reading of zero was achieved at the three vertical monitoring depths. Methane readings of zero were achieved approximately 20 feet south of GP-1 in the area designated as Row 3 (see Figure 2).

GP-2 Area

The soil gas investigation adjacent to and south of GP-2 included 20 monitoring locations. These locations are shown on Figure 3. Overhead power lines run east-west just south of 12th Street itself. Due to the low hanging wires (distance between the Geoprobe rig boom and the wires) soil gas monitoring was not conducted within 20 feet of either side of the power lines. Soil gas readings were not collected from Columns A1 or H.

Vertical gas monitoring was conducted at depths of 2-4 feet, 4-6 feet, 10-12 feet, 12-14 feet, and 18-20 feet below grade. Monitoring was terminated at the gravel/more permeable layer located at approximately 20 feet below grade. Groundwater in the area of GP-2 is estimated at 32 feet below grade. Soil gas readings from the GP-2 area investigation are presented in Table 4.

Monitoring locations were extended south of GP-2 until a methane reading of zero was achieved at the five vertical monitoring depths. Methane readings of zero were achieved approximately 100 feet south/southeast of GP-2 in the area designated as Row 8 (see Figure 3). There is a sharp drop off to a former gravel pit located another 20-30 feet south of Row 8.

Adjacent Potential Receptors - Aggregate Industries Buildings

The three structures located at 475 N. 12th Street, Plainwell, Michigan are owned by Aggregate Industries and were identified as potential landfill gas receptors. The buildings were evaluated for landfill gas intrusion. A sketch of the buildings provided by Otsego Township is included in Attachment B. Photographs of both the exteriors and interiors of the buildings are included in Attachment B.

The geotechnical laboratory (i.e., the southern 1,008 square foot building) was constructed on a concrete slab in 1984 and is occupied Monday through Friday by one individual approximately 4-5 hours per day. During the winter months (January through March) the building is unoccupied much of the time. The building is used for geotechnical analysis (primarily sieve analysis). The western two-thirds of the building are used as the geotechnical laboratory. Large (closet sized) shaker units and a natural gas fired stove are present in this portion of the building. The southeast room is utilized as office space. The building includes a restroom with a sink and shower. The mechanical room with the natural gas furnace is located in the north central portion of the building. The floor is bare concrete except for the bathroom and the back storage room which had linoleum covering the concrete floor. Cracks or holes were not observed in the concrete floor and the linoleum was in good overall condition. Floor drains were present in the restroom shower and the mechanical room.

Indoor air monitoring was conducted at the concrete slab in 13 locations, including the two floor drains, within the geotechnical laboratory as shown on Figure 4. The results of the geotechnical laboratory building monitoring are presented in Table 5. Typical operations, including the operation of the natural gas stove to dry samples, was being conducted just prior to the monitoring event. The technician ceased operation of the stove before the collection of the indoor air readings.

The northern two buildings, the warehouse and equipment shop were constructed on concrete slabs. The equipment shop (2,160 square feet) was constructed in 1956 and is a steel frame with metal siding. The warehouse building (1,512 square feet) was constructed in 1963 and is a steel siding on a wooden post construction. Both buildings are currently used for parts/equipment storage and are not occupied by Aggregate Industries.

Indoor air monitoring was conducted at 13 locations within the warehouse building as shown on Figure 5. Cracks were noted within the concrete slab as noted on Figure 5. Indoor air monitoring included points along the cracks and seams in the concrete. It should be noted that this building is not air tight with many holes in the siding and large gaps in the doorway. The results of the warehouse building monitoring are presented in Table 6.

Indoor air monitoring was conducted at 10 locations within the equipment shop as shown on Figure 6. The majority of this floor in this building (approximately 60 percent) was covered with large wire spools and other supplies/equipment. Cracks were observed in the concrete floor as well as a section of newer concrete in the southwest corner of the building. Monitoring locations included points along the cracks and seams. The building is not air tight with many holes in the siding and large gaps at the doorway to the north. The results of the equipment shop monitoring are presented in Table 7.

3.0 SOIL GAS AND LANDFILL GAS RESULTS & DISCUSSION

GP-1 Area

CH_4 readings in the area around GP-1 quickly dissipated south of the landfill. CH_4 readings between the 4-6 and 6-8 foot depths did not show significant variation. No particular seam or preferential pathway for landfill gas migration was found during the investigation of the soils in the area of GP-1.

CH_4 readings recorded near the bend in the landfill (Columns A2, A and B) were observed at higher levels than Columns C through I, which is likely due to the influence on the soil gas from both the east edge of the landfill and the south edge. CH_4 migration in the area of GP-1 is limited to within less than 30 feet south of the landfill.

Pressure was not detected at the monitoring points.

GP-2 Area

CH_4 readings recorded in the area adjacent to and south of GP-2 decreased slightly between Row 1, which is generally parallel to GP-2, and Row 2 which was approximately 10 feet south of Row 1. CH_4 readings obtained at Row 3 were recorded at zero for the 2-4 foot interval and just above detection levels for the 4-6

foot interval. Deeper zones (10-12, 12-14 and 18-20 feet below grade) had CH_4 detections between 1.8 and 7.5 percent by volume in Row 3.

Monitoring was not conducted in Row 4.

Row 5, which was positioned approximately 40 feet south of GP-2, also produced very low detections of CH_4 in the 2-4, 4-6 foot intervals. Column F produced the highest CH_4 readings for the depths of 10-12 feet and 12-14 feet below grade in Row 5. CH_4 readings in the 18-20 foot interval at Row 5 were generally consistent between 7.6 and 9.3 percent by volume.

CH_4 readings obtained from Row 6 were between below detection limits to 0.1 percent by volume for the depths of 2-4, 4-6, 10-12 and 12-14 feet below grade. CH_4 was not detected in either Column B or D in Row 6 at the 18-20 foot interval. Column F produced a reading of 2.9 percent CH_4 at the 18-20 foot interval. Due to the continued CH_4 readings in the Column F area an additional monitoring location was selected in this column.

Monitoring was not conducted in Row 7.

The last monitoring location was at Column F in Row 8 (F8), approximately 100 feet southeast of GP-2. CH_4 was not detected in the depths monitored (2-4, 4-6, 10-12, 12-14, 18-20 feet below grade) at this location. There is a sharp drop off to a former gravel pit located another 20-30 feet south of monitoring location F8.

Soil gas pressure was not detected at the monitoring points adjacent and south of GP-2.

Aggregate Industries - Geotechnical Laboratory

CH_4 was detected at 0.1 % at 10 (D –M) of the 13 monitoring locations within the geotechnical laboratory. Monitoring locations D through M are located throughout the building east of the entry door. Locations included equipment rooms/closets, mechanical room, a storage closet as well as the office, restroom and storage room.

Aggregate Industries - Warehouse

CH_4 was not detected at any of the 13 monitoring locations within the warehouse building.

Aggregate Industries - Equipment Shop

CH_4 was not detected at any of the10 monitoring locations within the equipment shop building.

4.0 CONCLUSIONS AND RECOMMENDATIONS

GP-1 Area

The CH_4 dissipated approximately 30 feet south of GP-1 and at each interval of measurement. The combination of lack of pressure gradient and measurable CH_4 concentrations is indicative of a diffusion of soil gas. There are no local receptors in this area; therefore, no further action is required in this portion of the Site.

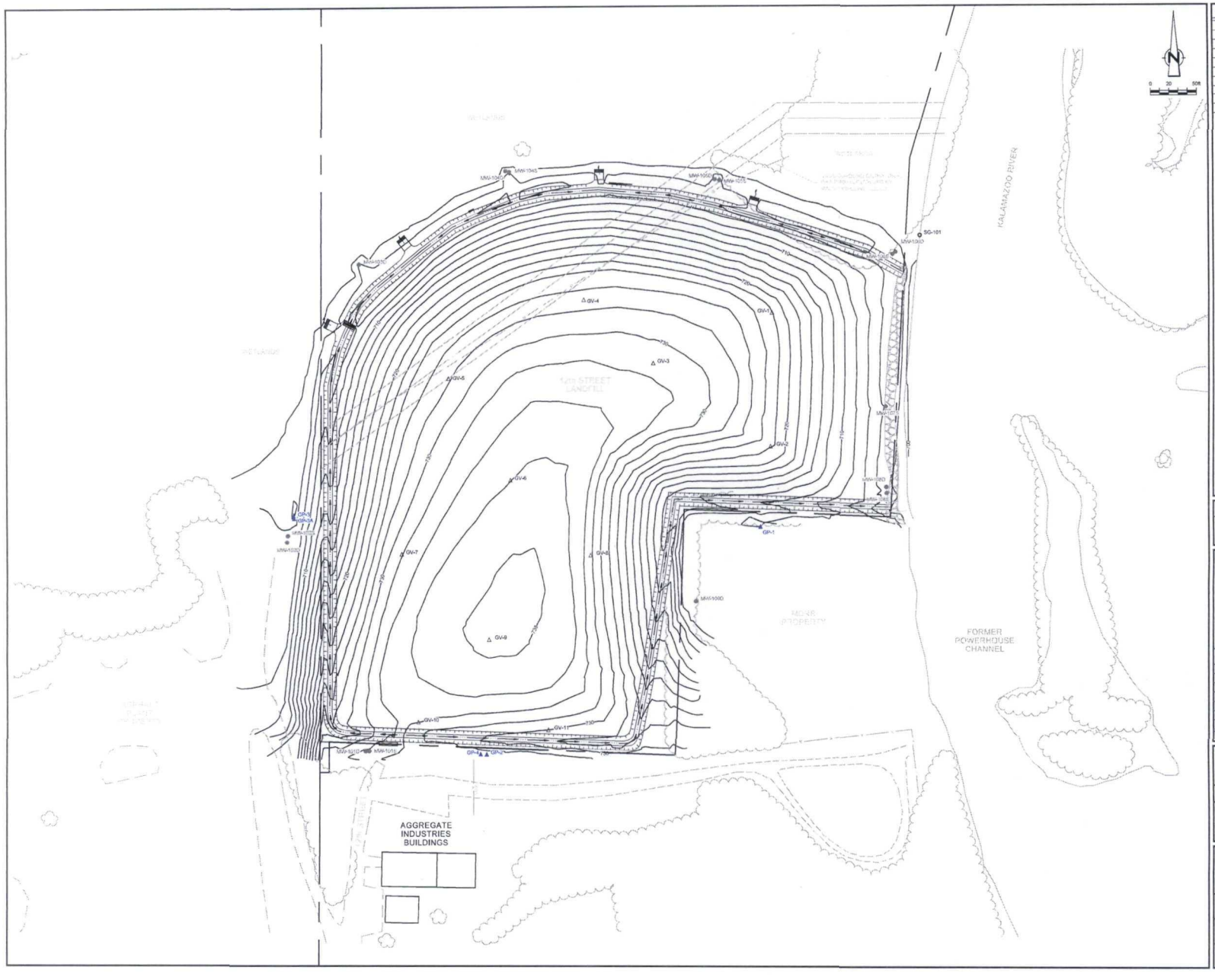
GP-2 Area

The CH_4 results were similar to GP-1 with lateral distribution that dissipated to the south. The CH_4 detections were also at depth, following a potential gravel seam which acts as a preferential pathway for landfill gas migration. The CH_4 did dissipate to non-detect levels at depth as the measurements were obtained to the south. Therefore no further action is required at this location since the CH_4 was defined to the point of non-detect at depth at a location to the east of a building that is used for an equipment shop and warehouse, and there is no gradient for soil gas migration other than diffusion.

Aggregate Industries Buildings

The monitoring conducted within the northern Aggregate Industries Buildings (equipment shop and the warehouse) did not indicate the presence of CH_4. No further monitoring of these buildings is required given that the soil gas distribution in GP-2 Area has been defined.

Detections of CH_4 below the ambient air criteria of 0.5 percent were recorded within the geotechnical building. Evidence suggests that the low level of CH_4 is from a source within the building and not soil gas; however, due to the presence of CH_4 CRA will conduct one indoor air monitoring event in the geotechnical building in approximately 6 months to confirm that CH_4 is not present. If the building is being utilized for sample preparation during this time, the stove will be turned off in advance of the monitoring event and the building will be ventilated. CH_4 levels recorded during the July 12th, 2013 do not represent an immediate health impact. The information obtained during this follow-up monitoring event will be presented in a Memorandum documenting the findings.



No.	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING EDGE OF WATER
- EXISTING TREES AND/OR BRUSH
- 718 — FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE
- △ GV-1 — GAS VENT LOCATION
- ⊕ MW-1005 — MONITORING WELL LOCATION
- ▲ GP-1 — GAS PROBE LOCATION
- ○ SG-101 — STAFF GAUGE LOCATION

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

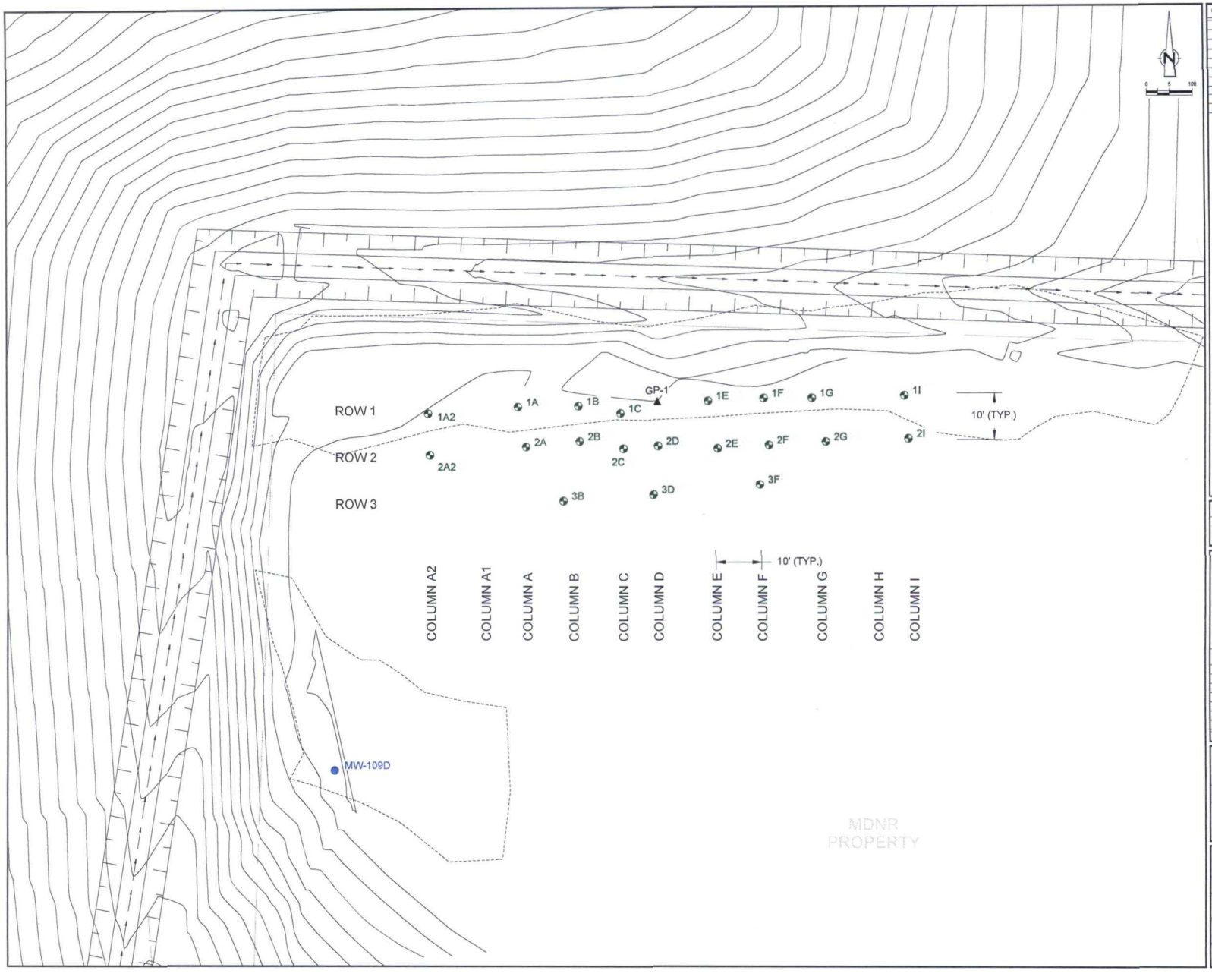
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

SITE FEATURES

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:			
BASE ADAPTED FROM PREVIOUS RMT DESIGN			
Project Manager: J. DEMBOWSKE	Reviewed By: G. CARLI	Date: JULY 2013	
Scale: AS SHOWN	Project No.: 056393-07	Report No.: MEMO023	Drawing No.: figure 1

056393-07(MEMO023)GN-SC004 JUL 26/2013



N/2	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- 718 — FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE
- MW-109D — MONITORING WELL LOCATION
- GP-1 — GAS PROBE LOCATION
- 2D — GAS MONITORING LOCATION (CRA 2013)
- EXTENT OF PAPER RESIDUALS EXCAVATED FROM MDNR PROPERTY DURING THE REMEDIAL ACTION

SCALE VERIFICATION

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DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

SOIL GAS INVESTIGATION

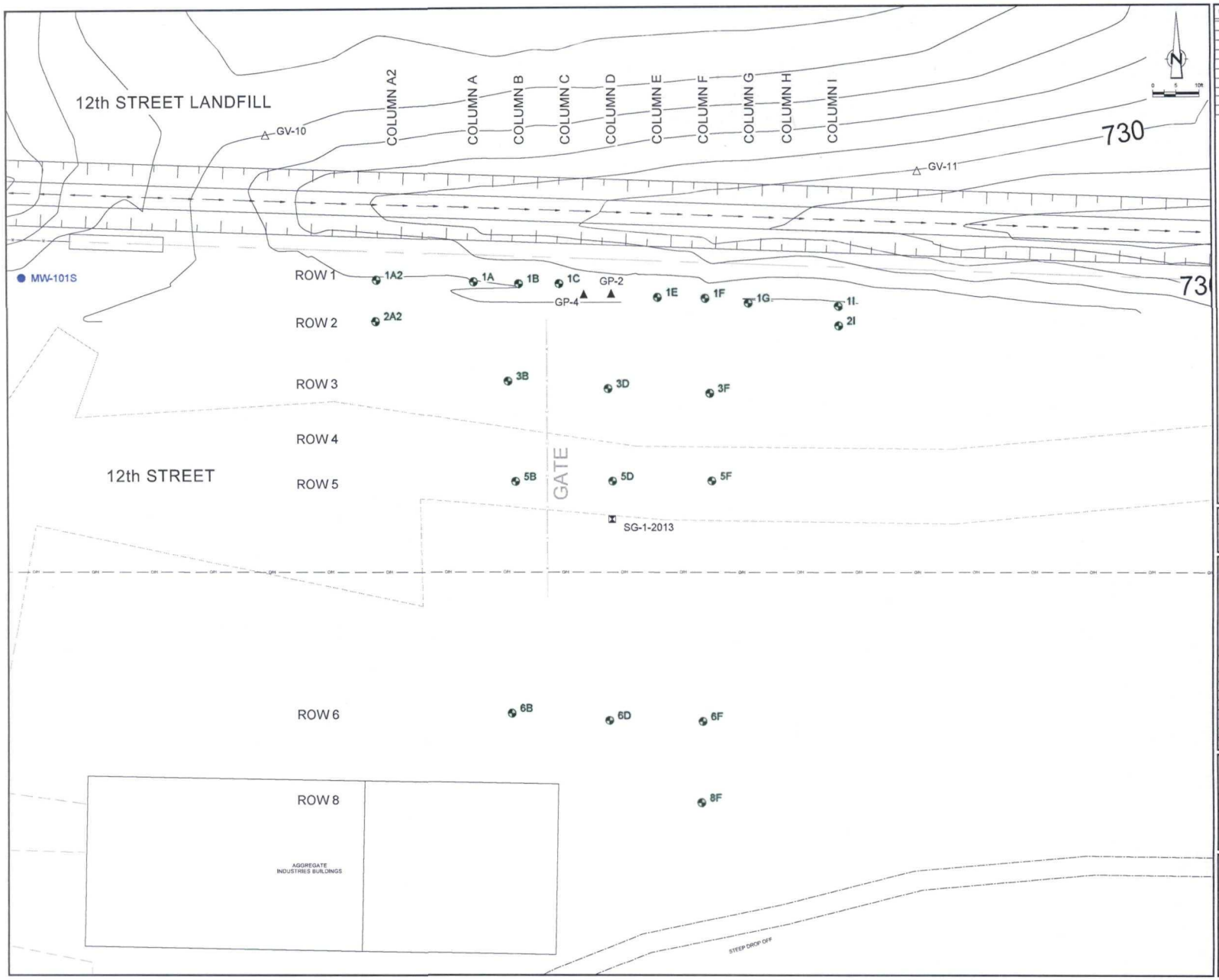
SOIL GAS MONITORING LOCATIONS GRID LAYOUT - GP-1 AREA

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager	Reviewed By	Date	
J. DEMBOWSKE	D. GATRELL	AUGUST 2013	
Scale: AS SHOWN	Project N°: 056393-07	Report N°: MEMO023	Drawing N°: figure 2

056393-07(MEMO023)GN-SC006 AUG 20/2013



NO.	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- 748 FINAL ELEVATION CONTOURS
- OH APPROXIMATE LOCATION OF OVERHEAD POWERLINE
- ROAD/DRAINAGE SWALE
- MW-101S MONITORING WELL LOCATION
- GP-2 GAS PROBE LOCATION
- GV-11 GAS VENT LOCATION
- 30-8 GAS MONITORING LOCATION (CRA2013)
- SG-1-2013 SOIL BORING LOCATION

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

SOIL GAS INVESTIGATION

SOIL GAS MONITORING LOCATIONS
GRID LAYOUT - GP-2 AREA

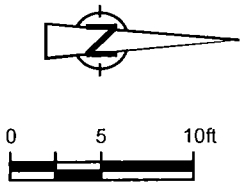
CONESTOGA-ROVERS & ASSOCIATES

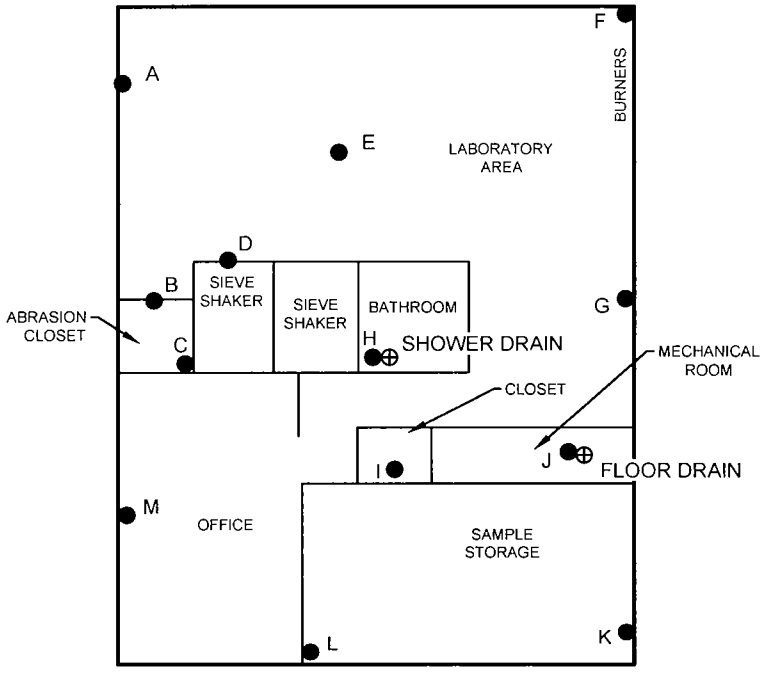
Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager	Reviewed By:	Date:
J. DEMBOWSKE	D. GATRELL	AUGUST 2013

Scale:	Project No.:	Report No.:	Drawing No.:
AS SHOWN	056393-07	MEMO023	figure 3

056393-07(MEMO023)GN-SC007 AUG 20/2013





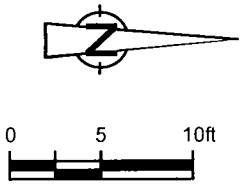
LEGEND

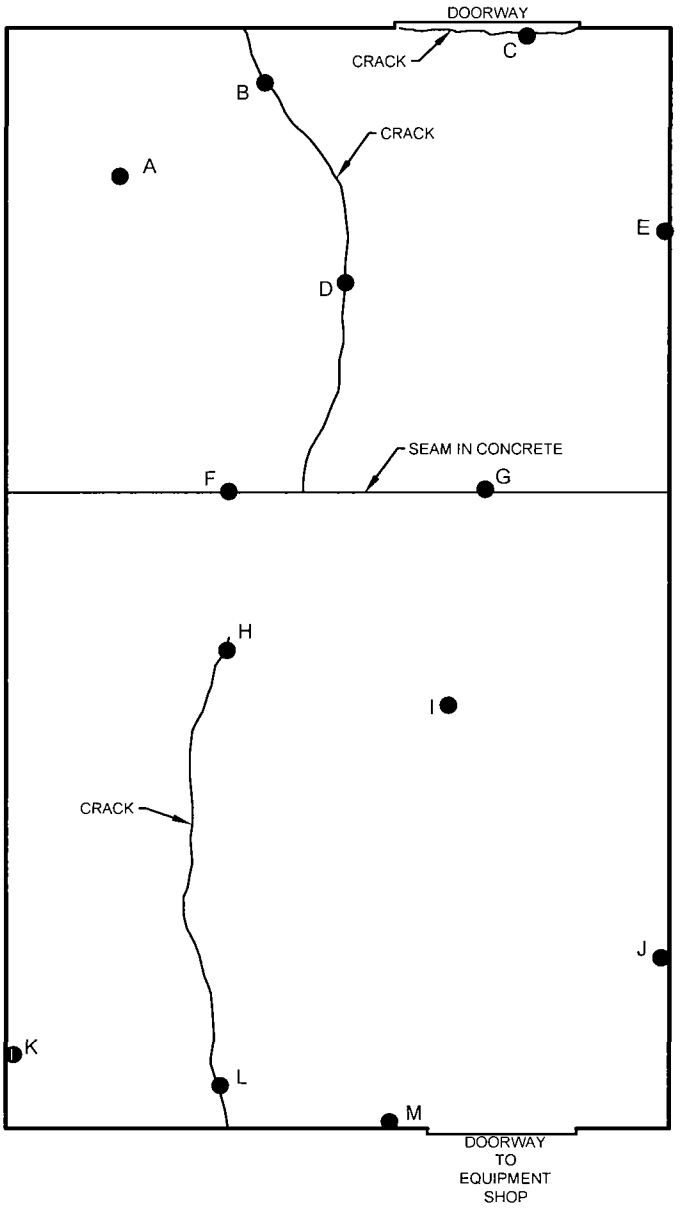
● L MONITORING LOCATION

figure 4

INDOOR AIR MONITORING LOCATIONS
AGGREGATE INDUSTRIES - GEOTECHNICAL LABORATORY
12TH STREET LANDFILL
Otsego Township, Michigan

CRA





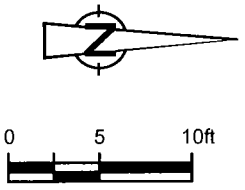
LEGEND

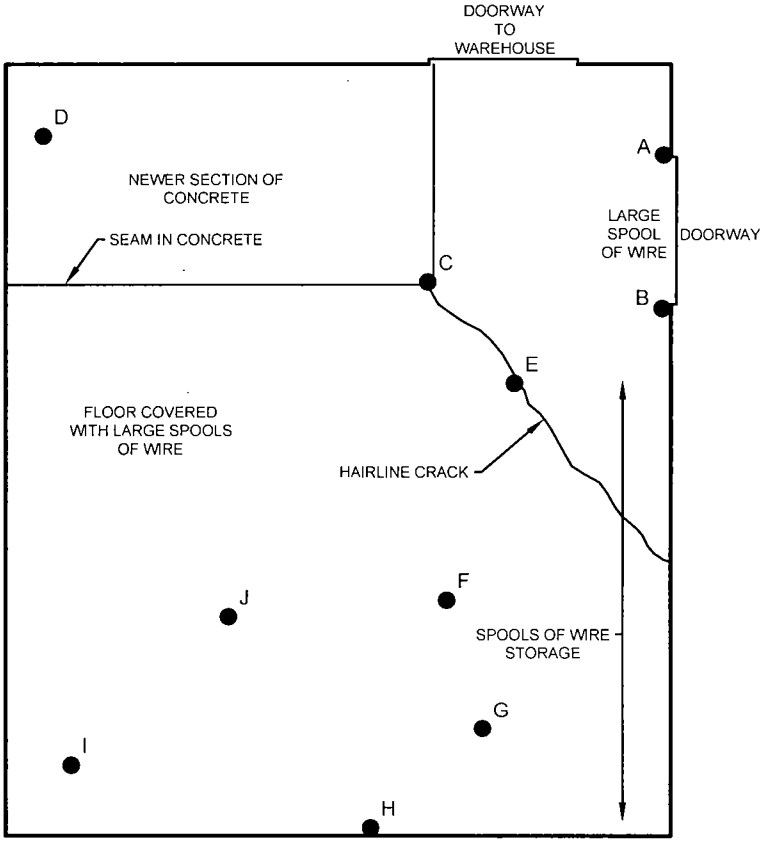
L MONITORING LOCATION

figure 5

INDOOR AIR MONITORING LOCATIONS
AGGREGATE INDUSTRIES - WAREHOUSE
12TH STREET LANDFILL
Otsego Township, Michigan

056393-07(MEMO023)GN-SC002 AUG 20/2013





LEGEND

● A MONITORING LOCATION

figure 6

INDOOR AIR MONITORING LOCATIONS
AGGREGATE INDUSTRIES - EQUIPMENT SHOP
12TH STREET LANDFILL
Otsego Township, Michigan

CRA

056393-07(MEMO023)GN-SC003 AUG 20/2013

TABLE 1

LANDFILL GAS QUALITY MONITORING
GAS PROBES OCTOBER 2011 - JULY 2013
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Location	Ground Surface Elevation	Probe Depth (Feet)	Screen Length (Feet)	Top of Screen Elevation (Feet AMSL)	Seconds Purged	Date	Pressure (inches of W/C)	Methane (% by Volume)	Carbon Dioxide (% by Volume)	Oxygen (% by Volume)
GP-1	707.35	4	2	705.35	300	10/27/11	0.00	49.0	37.1	0.6
					300	2/6/12	0.01	30.9	29.2	1.0
					300	4/23/12	-0.01	43	33.1	6.0
					300	4/30/12	0.00	38.5	32.1	0.0
					300	7/23/12	0.01	33.7	32.0	0.0
					300	10/22/12	0.00	35.6	33.7	0.0
					300	1/25/13	0.00	26.4	29.5	0.6
					300	4/19/13	0.03	59.9	40.1	0.0
					300	4/22/13	0.01	51.1	33.5	0.2
					300	4/24/13	0.01	57.4	39.1	0.0
					300	7/10/13	0.00	44.6	40.0	0.6
GP-2	732.88	35	25	727.88	300	10/27/11	-0.10	23.3	20.8	0.1
					300	2/6/12	0.00	15.6	18.5	1.3
					300	4/23/12	0.00	22.3	18.7	3.4
					300	4/30/12	0.00	21.1	17.7	0.0
					300	7/23/12	0.00	4.7	14.7	0.0
					300	10/22/12	-0.01	21.3	20.5	0.0
					300	1/25/13	0.04	18.5	21.2	0.0
					300	4/19/13	0.09	21.6	19.5	0.1
					300	4/22/13	0.03	18.3	16.4	0.2
					300	4/24/13	0.03	20.8	19.2	0.1
					300	7/10/13	0.03	15.2	18.7	0.3
GP-3	703.51	5	2	700.51	300	10/27/11	-0.00	1.1	0.5	15.6
					300	2/6/12	0.00	0.0	0.1	21.6[1]
					<300	4/23/12	0.00	NC[2]	NC[2]	NC[2]
					<300	4/30/12	0.00	NC[2]	NC[2]	NC[2]
					300	7/23/12	0.04	0.0	2.3	07.4
					300	10/22/12	0.00	1.3	2.5	8.5
				Water in probe	<300	1/25/13	0.06	0.0	0.1	18.7
				Water in probe	68	4/19/13	0.04	0.0	0.2	18.5
				Water in probe	70	4/22/13	0.05	0.0	0.1	20.8
				Water in probe	65	4/24/13	0.05	0.0	0.2	18.8
				Water in probe	<300	7/11/13	NC[2]	NC[2]	NC[2]	NC[2]

Notes:
W/C = Water Column
NC = Not Collected
[1] = High oxygen and low carbon dioxide indicates potential short circuiting in probe.
[2] = Water in bottom of probe.

TABLE 2

LANDFILL GAS VENT READINGS - APRIL 30, 2012
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

	GV-1	*GV-2*	*GV-3*	*GV-4*	*GV-5*	*GV-6*	*GV-7*	*GV-8*	*GV-9*	*GV-10*	*GV-11*
Methane (% by Volume)	60.8	58.5	64	61.1	56.5	47.1	56.1	52.3	30	44.4	15.1
Carbon Dioxide (% by Volume)	35	37.3	27.5	35.2	33.5	21.2	36.8	39.8	19.3	12.4	24
Oxygen (% by Volume)	0	0	0	0	0.9	4.7	0	0	5	0	2.5
Pressure (inches of W/C)	0	0	0	0	0	0	0	0	0	0	0

Notes:
W/C=Water Column
GV-#= Gas Vent

TABLE 3

SOIL GAS MONITORING ADJACENT TO GP-1
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
1	A2	2-4 ft bgl	0.0	28.3	24.4	8.7
	A		0.0	18.2	14.1	11.3
	B		0.0	25.3	18.6	10.6
	C		0.0	35.6	31.9	1.0
	D		NC	NC	NC	NC
	E		0.0	34.2	30.8	3.7
	F		0.0	33.2	28.8	4.9
	G		0.0	19.9	16.5	10.7
	I		0.0	11.7	8.9	15.0
1	A2	4-6 ft bgl	0.0	45.8	42.0	2.3
	A		0.0	53.7	45.1	0.9
	B		0.0	51.6	39.9	0.9
	C		0.0	29.9	25.5	4.4
	D		NC	NC	NC	NC
	E		0.0	42.4	37.0	1.3
	F		0.0	39.2	37.3	1.2
	G		0.0	40.6	37.7	0.7
	I		0.0	33.2	31.2	3.0
1	A2	6-8 ft bgl	0.0	40.0	35.6	4.5
	A		0.0	53.5	44.5	1.6
	B		0.0	43.4	31.2	3.9
	C		0.0	32.9	27.7	1.4
	D		NC	NC	NC	NC
	E		0.0	46.3	35.6	0.9
	F		0.0	38.9	36.6	1.1
	G		0.0	30.3	27.4	5.1
	I		0.0	37.0	31.3	3.0
2	A2	2-4 ft bgl	0.0	7.0	10.5	13.1
	A		0.0	15.5	18.8	9.5
	B		0.0	1.2	4.7	16.9
	C		0.0	0.0	3.0	17.7
	D		0.0	0.9	7.0	15.0
	E		0.0	0.0	3.7	17.3
	F		0.0	0.0	1.5	19.6
	G		0.0	0.0	1.7	19.2
	I		0.0	14.1	20.7	1.0

SOIL GAS MONITORING ADJACENT TO GP-1
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
2	A2	4-6 ft bgl	0.0	25.3	30.6	1.8
	A		0.0	30.1	32.0	1.4
	B		0.0	8.3	17.1	6.5
	C		0.0	0.0	13.2	7.1
	D		0.0	0.0	11.7	9.3
	E		0.0	0.0	9.5	11.4
	F		0.0	0.0	6.4	14.4
	G		0.0	0.0	8.2	12.2
	I		0.0	0.6	10.0	8.9
2	A2	6-8 ft bgl	0.0	25.0	29.2	1.8
	A		0.0	22.7	29.1	0.6
	B		0.0	12.5	23.1	2.2
	C		0.0	1.0	19.5	1.4
	D		0.0	0.0	12.5	6.1
	E		0.0	4.0	21.1	1.7
	F		0.0	0.0	12.8	7.6
	G		0.0	0.0	14.5	5.5
	I		0.0	8.0	19.4	0.8
3	A2	2-4 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	3.1	17.4
	C		NC	NC	NC	NC
	D		0.0	0.0	1.9	18.9
	E		NC	NC	NC	NC
	F		0.0	0.0	1.3	19.0
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
3	A2	4-6 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	5.5	15.3
	C		NC	NC	NC	NC
	D		0.0	0.0	4.0	17.0
	E		NC	NC	NC	NC
	F		0.0	0.0	6.7	14.0
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC

TABLE 3

SOIL GAS MONITORING ADJACENT TO GP-1
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
3	A2	6-8 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	8.7	12.2
	C		NC	NC	NC	NC
	D		0.0	0.0	5.9	15.1
	E		NC	NC	NC	NC
	F		0.0	0.0	7.8	12.5
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC

Notes:
* Readings after 3 minutes
W/C=Water Column
NC=Not Collected
bgl=below grade level
ft=feet
Columns A1 and H were not utilized for soil gas monitoring locations

TABLE 4

SOIL GAS MONITORING ADJACENT TO GP-2
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
1	A2	2-4 ft bgl	0.0	19.9	14.6	1.1
	A		0.0	18.5	14.9	0.7
	B		0.0	15.1	15.6	1.0
	C		0.0	14.7	17.4	0.8
	D		NC	NC	NC	NC
	E		0.0	10.2	18.9	1.0
	F		0.0	13.1	18.2	1.8
	G		0.0	7.0	10.2	9.6
	I		0.0	20.3	23.5	0.9
1	A2	4-6 ft bgl	0.0	22.6	15.3	0.1
	A		0.0	18.7	13.0	0.9
	B		0.0	16.0	15.2	1.5
	C		0.0	16.1	18.3	0.3
	D		NC	NC	NC	NC
	E		0.0	10.4	17.6	1.2
	F		0.0	13.7	18.8	1.2
	G		0.0	11.2	14.0	6.2
	I		0.0	19.0	20.9	2.1
1	A2	10-12 ft bgl	0.0	19.4	15.1	0.9
	A		0.0	19.6	15.4	0.5
	B		0.0	16.2	15.6	1.3
	C		0.0	15.1	18.0	0.4
	D		NC	NC	NC	NC
	E		0.0	12.4	18.3	1.1
	F		0.0	14.6	18.8	1.1
	G		0.0	17.2	21.4	0.5
	I		0.0	20.5	22.9	0.9
1	A2	12-14 ft bgl	0.0	19.7	13.0	2.4
	A		0.0	20	16.1	0.0
	B		0.0	16.3	15.4	1.0
	C		0.0	14.4	17.2	0.8
	D		NC	NC	NC	NC
	E		0.0	12.6	18.1	0.9
	F		0.0	14.1	17.8	1.6
	G		0.0	16.7	20.2	2.0
	I		0.0	17.7	20.0	2.8

SOIL GAS MONITORING ADJACENT TO GP-2
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
1	A2	18-20 ft bgl	0.0	21.2	14.1	2.0
	A		0.0	17.5	14.1	1.2
	B		0.0	18.7	14.8	0.2
	C		0.0	18.3	15.6	0.5
	D		NC	NC	NC	NC
	E		0.0	16.6	13.6	1.3
	F		0.0	18.5	15.0	0.3
	G		0.0	15	16.5	2.1
	I		0.0	19.1	19.7	0.0
2	A2	2-4 ft bgl	0.0	14.1	14	1.8
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		NC	NC	NC	NC
	G		NC	NC	NC	NC
	I		0.0	15.1	21.2	0.9
2	A2	4-6 ft bgl	0.0	14.6	13.6	2.3
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		NC	NC	NC	NC
	G		NC	NC	NC	NC
	I		0.0	14.1	20.7	1.0
2	A2	10-12 ft bgl	0.0	15.0	13.0	2.3
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		NC	NC	NC	NC
	G		NC	NC	NC	NC
	I		0.0	15.3	22.1	0.1

SOIL GAS MONITORING ADJACENT TO GP-2
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
2	A2	12-14 ft bgl	0.0	11.3	10.8	2.6
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		NC	NC	NC	NC
	G		NC	NC	NC	NC
	I		0.0	14.0	21.4	0.6
2	A2	18-20 ft bgl	0.0	15.0	13.1	1.0
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		NC	NC	NC	NC
	G		NC	NC	NC	NC
	I		0.0	18.9	20.0	0.2
3	A2	2-4 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	10.8	6.8
	C		NC	NC	NC	NC
	D		0.0	0.0	9.5	8.9
	E		NC	NC	NC	NC
	F		0.0	0.0	10.8	6.8
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
3	A2	4-6 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.1	10.4	6.7
	C		NC	NC	NC	NC
	D		0.0	0.1	12.4	5.4
	E		NC	NC	NC	NC
	F		0.0	0.0	13.1	4.3
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC

TABLE 4

SOIL GAS MONITORING ADJACENT TO GP-2
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
3	A2	10-12 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	3.2	14.9	1.0
	C		NC	NC	NC	NC
	D		0.0	1.8	14.9	2.0
	E		NC	NC	NC	NC
	F		0.0	4.4	17.5	0.6
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
3	A2	12-14 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	4.5	15.1	1.4
	C		NC	NC	NC	NC
	D		0.0	3.0	16.2	1.0
	E		NC	NC	NC	NC
	F		0.0	5.1	16.3	1.4
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
3	A2	18-20 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	4.0	10.0	2.2
	C		NC	NC	NC	NC
	D		0.0	3.0	15.5	1.4
	E		NC	NC	NC	NC
	F		0.0	7.5	14.5	2.4
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
5	A2	2-4 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	12.4	4.7
	C		NC	NC	NC	NC
	D		0.0	0.0	7.8	10.4
	E		NC	NC	NC	NC
	F		0.0	0.0	11.1	3.6
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC

SOIL GAS MONITORING ADJACENT TO GP-2
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
5	A2	4-6 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	13.7	2.9
	C		NC	NC	NC	NC
	D		0.0	0.1	13.9	1.1
	E		NC	NC	NC	NC
	F		0.0	0.4	9.7	3.0
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
5	A2	10-12 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	8.5	8.4
	C		NC	NC	NC	NC
	D		0.0	0.2	15.9	1.0
	E		NC	NC	NC	NC
	F		0.0	2.4	15.1	1.8
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
5	A2	12-14 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	14.0	2.6
	C		NC	NC	NC	NC
	D		0.0	0.3	13.7	2.8
	E		NC	NC	NC	NC
	F		0.0	2.2	13.2	3.2
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
5	A2	18-20 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	9.3	13.2	0.4
	C		NC	NC	NC	NC
	D		0.0	8.9	13.4	0.4
	E		NC	NC	NC	NC
	F		0.0	7.6	12.0	1.0
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC

TABLE 4

SOIL GAS MONITORING ADJACENT TO GP-2
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
6	A2	2-4 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	5.7	10.8
	C		NC	NC	NC	NC
	D		0.0	0.0	2.0	18.2
	E		NC	NC	NC	NC
	F		0.0	0.1	6.3	11.7
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
6	A2	4-6 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	2.7	16.2
	C		NC	NC	NC	NC
	D		0.0	0.0	2.4	17.1
	E		NC	NC	NC	NC
	F		0.0	0.1	5.1	12.9
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
6	A2	10-12 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	2.4	16.3
	C		NC	NC	NC	NC
	D		0.0	0.0	1.8	16.9
	E		NC	NC	NC	NC
	F		0.0	0.1	3.6	14.3
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
6	A2	12-14 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	2.4	16.4
	C		NC	NC	NC	NC
	D		0.0	0.0	1.9	18.0
	E		NC	NC	NC	NC
	F		0.0	0.1	2.9	15.0
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC

SOIL GAS MONITORING ADJACENT TO GP-2
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
6	A2	18-20 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		0.0	0.0	4.1	11.0
	C		NC	NC	NC	NC
	D		0.0	0.0	7.8	3.5
	E		NC	NC	NC	NC
	F		0.0	2.9	3.0	0.9
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
8	A2	2-4 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		0.0	0.0	4.1	15.0
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
8	A2	4-6 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		0.0	0.0	3.0	16.6
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
8	A2	10-12 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		0.0	0.0	3.5	15.2
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC

TABLE 4

SOIL GAS MONITORING ADJACENT TO GP-2
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL SITE
OTSEGO TOWNSHIP, MICHIGAN

Row	Column	Depth	Pressure (inches of W/C)	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
8	A2	12-14 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		0.0	0.0	4.5	14.0
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC
8	A2	18-20 ft bgl	NC	NC	NC	NC
	A		NC	NC	NC	NC
	B		NC	NC	NC	NC
	C		NC	NC	NC	NC
	D		NC	NC	NC	NC
	E		NC	NC	NC	NC
	F		0.0	0.0	4.1	11.6
	G		NC	NC	NC	NC
	I		NC	NC	NC	NC

Notes:
* Readings after 3 minutes
W/C=Water Column
NC=Not Collected
bgl=below grade level
ft=feet
Columns A1 and H were not utilized for soil gas monitoring locations

TABLE 5

INDOOR AIR MONITORING GEOTECHNICAL LABORATORY
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Location	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
A	0.0	0.0	20.8
B	0.0	0.0	20.8
C	0.0	0.0	21.0
D	0.1	0.0	21.0
E	0.1	0.0	21.3
F	0.1	0.0	21.3
G	0.1	0.0	21.3
H	0.1	0.0	21.3
I	0.1	0.0	21.2
J	0.1	0.0	21.1
K	0.1	0.0	21.2
L	0.1	0.0	21.2
M	0.1	0.0	21.2

TABLE 6
INDOOR AIR MONITORING - WAREHOUSE
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Location	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
A	0.0	0.0	21.0
B	0.0	0.0	21.0
C	0.0	0.0	20.9
D	0.0	0.0	21.0
E	0.0	0.0	21.0
F	0.0	0.0	21.2
G	0.0	0.0	21.2
H	0.0	0.0	21.2
I	0.0	0.0	21.2
J	0.0	0.0	21.2

TABLE 7

INDOOR AIR MONITORING - EQUIPMENT SHOP
SOIL GAS AND LANDFILL GAS INVESTIGATION
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Location	Methane* (% by Volume)	Carbon Dioxide * (% by Volume)	Oxygen* (% by Volume)
A	0.0	0.0	20.6
B	0.0	0.0	20.8
C	0.0	0.0	20.8
D	0.0	0.0	20.8
E	0.0	0.0	20.8
F	0.0	0.0	20.8
G	0.0	0.0	20.8
H	0.0	0.0	20.8
I	0.0	0.0	20.8
J	0.0	0.0	20.8
L	0.0	0.0	20.8
M	0.0	0.0	21.0

Note:
* Readings after 2 minutes

ATTACHMENT A

SOIL BORING LOG AND GAS PROBE CONSTRUCTION LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: SG-1-2013
DATE COMPLETED: July 9, 2013
DRILLING METHOD: DIRECT PUSH
FIELD PERSONNEL: B. WILLIAMS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	733.00						
0	GRAVEL ROAD	732.50						
2	SP-SAND, with fine gravel, trace silt, fine grained, compact, brown, moist			1DP		40		--
4								
6	SP-SAND, trace silt, trace fine gravel, compact, fine grained, brown, moist	728.00	BACKFILLED WITH BENTONITE CHIPS	2DP		80		--
8								
10			2-7/8" BOREHOLE					
12	- trace coarse gravel at 11.3ft BGS			3DP		90		--
14								
16								
18	- few fine gravel at 18.0ft BGS			4DP		90		--
20	SP/GP-SAND AND GRAVEL, trace silt, dense, fine grained sand, fine gravel, subangular to subrounded, brown, moist	713.00						
22				5DP		70		--
24	- trace coarse gravel at 24.0ft BGS							
26	END OF BOREHOLE @ 25.0ft BGS	708.00						
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 8/14/13

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: GP-3A
DATE COMPLETED: July 11, 2013
DRILLING METHOD: 4-1/4" HSA
FIELD PERSONNEL: B. WILLIAMS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	GAS PROBE	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	NORTHING: 351287.7 EASTING: 12771277 — TOP OF CASING / GROUND SURFACE	707.29 / 703.81					
0	SM/ML-SANDY SILT (FILL), trace fine grained gravel, compact, fine grained sand, no plasticity, brown, moist		CONCRETE; BENTONITE CHIPS; 1/2" PVC WELL CASING; 8-1/4" BOREHOLE; 1/2" PVC WELL SCREEN; SAND PACK				
2	END OF BOREHOLE @ 2.1ft BGS	701.71					

WELL DETAILS
Screened interval:
702.61 to 701.81ft
1.20 to 2.00ft BGS
Length: 0.8ft
Diameter: 0.5in
Slot Size: 0.010
Material: PVC
Seal:
703.31 to 702.91ft
0.50 to 0.90ft BGS
Material: BENTONITE CHIPS
Sand Pack:
702.91 to 701.71ft
0.90 to 2.10ft BGS
Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 7/24/13

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: 12TH ST LANDFILL
PROJECT NUMBER: 056393
CLIENT: WEYERHAEUSER COMPANY
LOCATION: OTSEGO, MI

HOLE DESIGNATION: GP-4
DATE COMPLETED: July 11, 2013
DRILLING METHOD: 4-1/4" HSA
FIELD PERSONNEL: B. WILLIAMS

NORTHING: 351034.2
EASTING: 12771480

TOP OF CASING 736.64
GROUND SURFACE 732.95

SM/ML-SANDY SILT (FILL), trace fine grained gravel, compact, fine grained sand, no plasticity, brown, moist

726.45

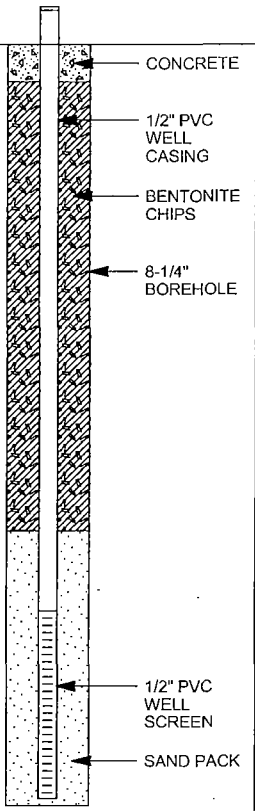
SP-SAND (native), trace silt, compact, fine grained, poorly graded, light yellowish brown, laminated, occasional thin oxidized lenses 1/8" thick

714.45

GP-SANDY GRAVEL, compact, fine grained sand, fine grained subrounded gravel, poorly graded, grayish brown, moist
- fine grained gravel, trace coarse grained sand at 19.0ft BGS
- fine grained gravel, with coarse grained sand, trace coarse grained gravel at 20.0ft BGS

712.75

END OF BOREHOLE @ 20.2ft BGS



WELL DETAILS
Screened interval:
717.95 to 712.95ft
15.00 to 20.00ft BGS
Length: 5ft
Diameter: 0.5in
Slot Size: 0.010
Material: PVC
Seal:
731.95 to 720.05ft
1.00 to 12.90ft BGS
Material: BENTONITE CHIPS
Sand Pack:
720.05 to 712.75ft
12.90 to 20.20ft BGS
Material: SAND

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	GAS PROBE	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
2							
4							
6							
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							
34							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 056393WIN.GPJ CRA_CORP.GDT 7/24/13

ATTACHMENT B

BUILDING SKETCHES AND PHOTOGRAPHIC LOG

SKETCH/AREA TABLE ADDENDUM

Parcel No 17-024-090-10

SUBJECT

Property Address 475 12TH ST

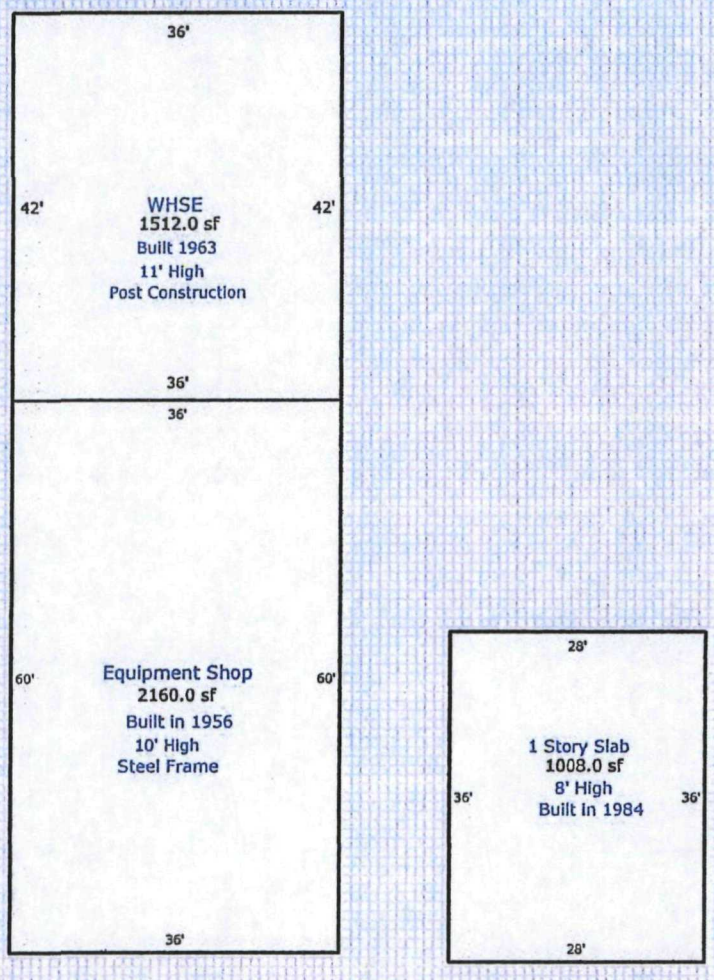
City OTSEGO County ALLEGAN State MI Zip 49078

Owner AGGREGATE INDUSTRIES

Client

Appraiser Name

IMPROVEMENTS SKETCH



Scale: 1" = 20'

AREA CALCULATIONS

AREA CALCULATIONS SUMMARY

Code	Description	Factor	Net Size	Perimeter	Net Totals
GLA1	First Floor	1.00	1008.00	128.0	
	First Floor	1.00	2160.00	192.0	
	First Floor	1.00	1512.00	156.0	4680.00

Net LIVABLE Area (rounded w/ factors) 4680

Comment Table 1	
Comment Table 2	Comment Table 3

PHOTO 1: Aggregate Industries' geotechnical laboratory. Looking east at the entrance to the building.

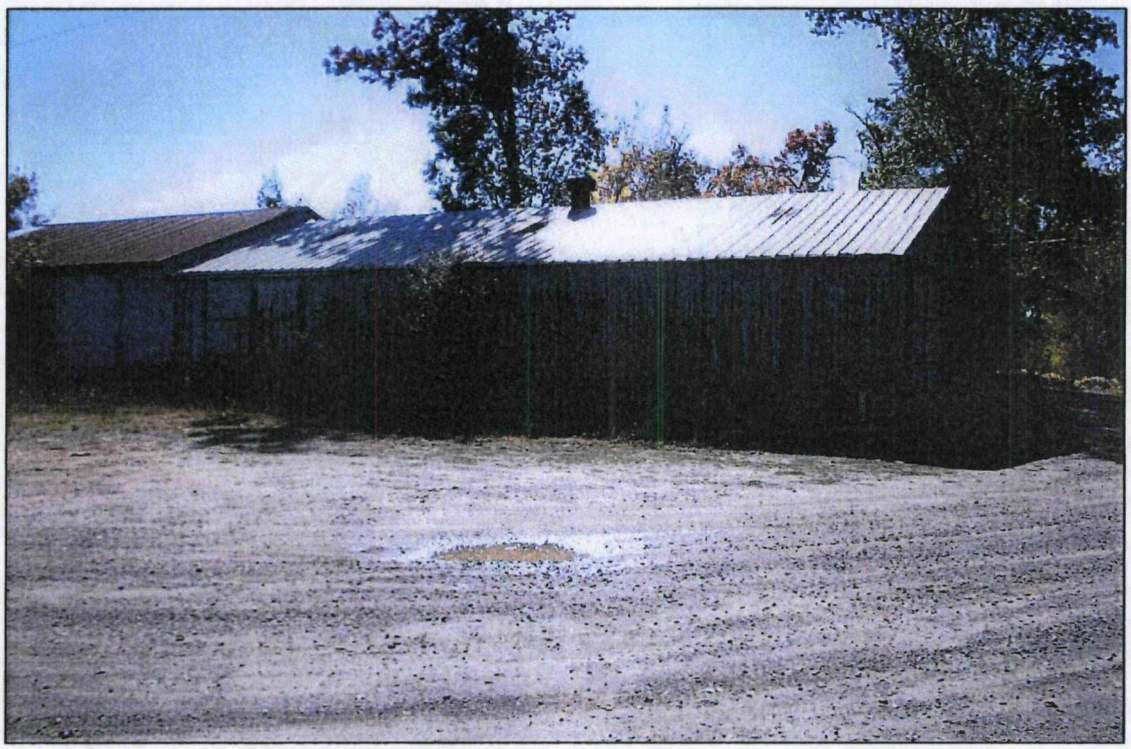


PHOTO 2: Aggregate Industries' warehouse and equipment shop.

Attachment B
LANDFILL GAS INVESTIGATION
12th STREET LANDFILL
Otsego Township, Michigan

CRA

PHOTO 3: Aggregate Industries equipment shop and warehouse. View looking west toward Wyoming Asphalt.

PHOTO 4: 12th Street heading east between Landfill and Aggregate Industries Equipment Shop.

Attachment B
LANDFILL GAS INVESTIGATION
12TH STREET LANDFILL
Otsego Township, Michigan